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THOMAS' NOXIOUS INSECTS OF ILLINOIS.¹—This report contains chapters on the insects affecting the cabbage, with a brief account of the parasites of domestic animals, and closes with an essay on the classification of the Acrididæ, or that family of locusts of which the Rocky Mountain pest is the type. The portion on cabbage insects contains considerable new matter. It is to be hoped that the State will furnish more original illustrations and better paper and press-work for subsequent reports, as these publications are of great value to the people. There are less typographical errors in this than in the two previous reports.

TRANSACTIONS OF THE ENTOMOLOGICAL SOCIETY OF LONDON FOR 1879.—This volume is rather thinner than its precursors, and while scarcely as important as usual may give a fair idea of the conditions and doings of the chief entomological society of Great Britain; indeed it stands nearly alone, for what other associations of a like nature there may be, are local and inconsiderable. There are twenty-five memoirs filling only 346 pages, so that the papers are, in most cases, quite brief; of this number twenty are descriptive, most of them purely so, and a few are simply faunal lists, mostly of exotic insects, and prepared by the officers of the British Museum.

Those more general in their nature and of interest to our readers, we will notice more at length. Eleanor A. Ormerod contributes some brief observations of the effects of low temperatures on larvæ; it appears that during the unusual cold of last winter in England, the insects were frozen, but eventually thawed out and were not seriously affected; what is said is confirmatory of what has been previously observed. In Dr. Fritz Müller's notes on the cases of some South Brazilian Trichoptera, or caddis flies, he describes those of *Rhyacophylax*, "the most curious of all our Hydropsychidæ." The cases themselves are rather rude canals covered with irregularly interwoven vegetable fibers, but at its mouth end each case has a large funnel-shaped veranda covered with a very beautiful silken net. The larvæ live in the rapids of various rivulets, and the entrance of the veranda is invariably directed towards the upper part of the rivulet, so as to intercept any eatable things brought down by the water."

In his morphological notes bearing on the origin of insects, Mr. J. Wood-Mason, of Calcutta, discusses certain points in the morphology of insects. He labors to prove that the antennæ of Machilis are homologues of the "antennæ (III) proper" of Crustacea, on the ground that he finds a process on the peduncle or base of the antennæ, which he thinks may represent the second or smaller branch of the antennæ of the Crustacea; especially as he finds a movable appendage present in *Lepisma*, and a large con-

¹ *Ninth Report of the State Entomologist on the Noxious and Beneficial Insects of the State of Illinois.* By CYRUS THOMAS, Ph.D., State Entomologist. Springfield, 1880. 8vo. pp. 142.

cal process in *Blatta*. He compares these structures with the second branch of the bifid antennæ of *Pauropus*. We may add that in certain coleopterous larvæ there are similar movable processes. These may be found to exist in other low or larval insects; but while interesting and suggestive, we scarcely see the need of going so far as to homologize them with the bi-flagellate antennæ of the Crustacea. These attempts are due to the hypothesis that the insects have been derived from the Crustacea, instead of what has seemed to us the better grounded view that the two classes have independently arisen from the worms, and also it is forcing nature into a straight jacket to attempt to institute too close homologies between the members of two classes.

Mr. Mason next shows that the mandibles of *Machilis* are articulated to the head just as in the chilognathous myriopods, though he adds that the joints are not movable. We have found what we suppose to be less distinct traces of an articulation in the mandible of *Campodea*. He concludes that the mandibles of the cockroaches are compound structures, "each made up of three (or four) such joints as are to be seen in *Machilis*."

Our author then asks, "Are the mandibles of insects and myriapods, like the jaws of *Peripatus*, modifications of walking legs?" He answers the query in the negative, and his reasons for his conclusion are apparently due to the influence of the hypothesis that insects are derived from Crustacea and not first hand from the worms. He judges that the mandibles of the higher *Thysanura* and the cockroaches as well as the myriopods "have resulted from the direct modification of such a biramous appendage as is seen in the earliest (nauplius) condition of many crustaceans." Embryology shows conclusively that the mandibles and in fact all the appendages of the head of both Crustacea and insects arise in the same manner and have the same form as the thoracic appendages. Would this not indicate that both arose from worms in which the rami and tentacles are obviously identical in form, and but slightly differentiated in function; and that the two classes followed distinct developmental paths, one with limbs adapted for swimming, as in the nauplius, with limbs all alike and no head differentiated from the rest of the body; while the terrestrial ancestor of the insects at once assumed what we have called the *Leptus* condition, having a head separate from the rest of the body, with biting appendages as distinguished from the walking limbs of the rest of the body? It seems to us that this is the broader, more tenable view. If we give ourselves up to too isolated, analytical views in animal morphology we shall be forever wandering, drawn hither and thither by false lights, when we should be guided by broad principles, of general application—but we do not wish to sit in judgment on the opinions of a most excellent observer.

Another point of interest studied by Mr. Mason is the nature

of "the abdominal appendages, which, in *Machilis*, are movably articulated to the hinder margin of the sterna of the eight antepenultimate somites, a pair to each somite." These as well as similar ones in *Scolopendrella*, he compares to the exopodite of Decapod Crustacea, notably *Peneus*, and thinks this an additional argument for the crustacean origin of insects. Now while Mr. Mason has pointed out some interesting points of resemblance between the Crustacea and insects, we do not think that these crustacean features have been derived from the Crustacea; but that they have independently arisen in the ancestral forms of each class. It will be interesting to follow up Mr. Mason's "suspicion that the limbs of myriopods are not strictly homologous with those of insects, but that they correspond with the rudimentary appendages of *Machilis*, and are consequently exopodites, the appendages of the legs in *Scolopendrella* representing the legs of insects, which would appear to be endopodites." This may or may not be the case, but we should not desire to fall into the error of drawing too close homologies between two sub-classes like the hexapodous and myriopodous Tracheata (insects).

Finally, our author, after considering the remarkable difference in the position of the genital openings exhibited by the different groups, and very generally by the opposite sexes of Arthropoda, believes this is "intelligible on the hypothesis that all the members of the sub-kingdom have descended from some worm-like creature, provided in every somite of its body with a pair of segmental organs or nephridia, and that different pairs of these organs have, in different descendants of this hypothetical ancestor, been connected in the genital aperture and ducts."

In a paper on the affinity of the genus *Polycytenes*, Mr. C. O. Waterhouse conclusively proves, by a winged form closely allied to the wingless *Polycytenes*, that this insect belongs near the *Hippoboscidae*, or horse-ticks and bird-flies. In a brief paper on the natural affinities of the Lepidoptera hitherto referred to the genus *Acronycta*, M. A. G. Butler removes several of the species to the *Arctiidae*, a subdivision of *Bombycid* moths. Our own observations on the structure of the head as well as the general form of the body, made several years ago, lead us to think that such a removal is quite unwarranted, and that the interesting analogies to the *Bombycids* are superficial, and not fundamental.

RECENT BOOKS AND PAMPHLETS.—Description of four new species of Silurian Fossils. By S. A. Miller. (From Jour. Cin. Soc. Nat. Hist., July, 1880.) 8vo, pp. 5, Pl. 1, 1880. From the author.

The Three Climates of Geology. By C. B. Warring. (From Penn Monthly, June, 1880.) 8vo, pp. 36. From the author.

Contributions to Invertebrate Palæontology, Nos. 2-8. By Dr. C. A. White. (Ext. from the Twelfth Annual Report of U. S. Geol. Surv., 1878.) 8vo, pp. 171, Pls. 42. From the author.

The Hessian Fly. By A. S. Packard. (Bull. No. 4, U. S. Ent. Com.) 8vo, pp. 43, Pls. 2, Map 1. From the author.